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## REMARKS

1. Examiner is thanked for correction of the misnumbered claims in Applicants' amendment of November 20, 2002.

2. Claims 1, 4-8, 13 and 27 have been amended to more particularly point out and distinctly claim the invention.

Claims 1 and 27 have been amended to incorporate the limitation that the composites of the invention are ballistically effective, flexible composites. Support for ballistic effectiveness is found on page 1 at line 9; page 5, lines 5-6; page 22, line 23, to page 23, line 1; and in the examples. Support for the flexibility characteristic is found on page 1 at line 9; page 4 at lines 16 and 24; page 5, lines 5-6; page 7, lines 17-10; and page 8, lines 11-13.

Claims 4 through 6 have been amended to clarify that it is the final volume ratio being set forth. Support is found in the specification on page 7, lines 5-14.

Claims 7-8 have been amended to again describe the polyethylene filaments as "ultrahigh molecular weight". Support is found in the claims as originally filed and in the specification in the paragraph bridging pages 12 and 13.

Claim 13 has been amended to correct its dependency.

The claim amendments are made in order to comply with requirements of form or to place the claims in better form for consideration on appeal. Since no new matter has been added by these amendments, and good and sufficient reasons have been presented why they are necessary and were not submitted earlier, it is respectfully submitted that they should be entered.

3. Claims 7 and 8 stand rejected under 35 USC§112, second paragraph. The Examiner is of the opinion that the recitation of "molecular weight" in claims 7 and 8 is indefinite since Applicants have not specified whether it is the weight average or number average molecular weight. Applicants respectfully disagree and request withdrawal of these rejections.

The MPEP, Section 2106, A. 2., sets forth the following criteria for determining compliance with 35 USC§112, second paragraph.

Office personnel shall determine whether the claims set out and circumscribe the invention with a reasonable degree of precision and particularity. In this regard, the definiteness of the language

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must be analyzed, not in a vacuum, but always in light of the teachings of the disclosure as it would be interpreted by one of ordinary skill in the art. Applicant's claims interpreted in light of the disclosure, must reasonably apprise a person of ordinary skill in the art of the invention.

It is respectfully submitted that one of ordinary skill in the art would readily understand the meaning of claims 7 and 8. Evidence of same has previously been submitted and is recapped as follows:

ASTM Standard method D4020-92 "Standard Specification for Ultra-high Molecular Weight Polyethylene Molding and Extrusion Materials" was attached to Applicants' November 20, 2002, response of 20 Nov. 2002. At paragraph 3.2.1.1, *Discussion*, it is clear that the ASTM standard indicates that it is commonly understood that the term "molecular weight" refers to "approximate weight average molecular weight."

Dr. M. E. McDonnell, an expert in the area of measuring molecular weights, provided a declaration that was attached to Applicants' May 23, 2002, response. This declaration stated that a number average molecular weight interpretation for the term "molecular weight" in the context of UHMW-PE is "... both not sensible and unlikely to be considered by workers in the field." Dr. McDonnell further states, "Classical, absolute molecular weight determination methods do not have the sensitivity to measure number average molecular weights for typical, unfractionated polyethylene samples greater than or equal to 500,000."

Copies of product data sheets for the polymers of USP's 5,558,448 and 6,202,726, cited by the Examiner, were included with Applicants' November 20, 2002, response. Each of the manufacturers of the UHMW-PE materials used in these patents used the term "molecular weight" without specifying the type of average. Attention is also called to the formula at the bottom of the Mipelon® data sheet for the calculation of molecular weight. It is identical to the formula given in ASTM Standard method D4020-92 above, and therefore defines a weight average molecular weight. This is additional evidence that the commonly understood meaning of the term "molecular weight" as applied to UHMW-PE is weight average molecular weight.

It is respectfully submitted that the manufacturers of the polymers cited in U.S.P. 5,558,448 and 6,202,726 are the proper reference when considering who

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one of ordinary skill in the art is, rather than the patentees (of the cited references) who simply used the materials. Furthermore, there is nothing in the cited patents to indicate that number average molecular weights were actually determined. It is respectfully submitted, in view of the manufacturers data sheets, that the person of ordinary skill in the art would conclude that the cited patents misstated the molecular weights and that the "number averages" quoted were in fact weight averages.

The USPTO has issued many patents where the claims have included "ultrahigh molecular weight polyethylene" without specifying whether it was number average or weight average. In some instances, the claims also failed to include a numerical range for the molecular weight. The following list of patents and relevant claims is set forth as exemplary. Note that the filing dates for these patents bracket that of the instant patent application.

United States Patent	Claims
6,524,742 B1	5
6,428,506 B1	1, 4
6,148,597	1, 6, 16
5,972,484	1-3, 5-6, 14
5,824,411	1, 6
5,684,124	1, 7

The last of the listed patents is assigned to E.I. DuPont de Nemours and Co.

In summary, it has been shown that ASTM International, expert opinion, manufacturers of UHMW-PE, and the USPTO as shown in its past actions, understand the terms "ultrahigh molecular weight polyethylene" and "molecular weight" as applied to UHMW-PE to have a definite meaning within the requirements of 35 USC§112.

In view of these facts, withdrawal of the rejection of claims 7 and 8 is respectfully requested.

4. Claims 1, 2-17, 19-23 and 27-28 stand rejected under 35 USC§103(a) as being unpatentable over Schirtzinger, USP 3,686,048 (the '048 patent), in view of WO 91/08895 to Li et al (the '895 patent). Applicants respectfully request the withdrawal of these rejections for the reasons that independent claims 1 and 27, as amended, include the following limitations that have no counterpart in either the '048 patent or the '895 patent or their combination.

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## a. Ballistic effectiveness and flexibility

In contrast to the present invention, neither the '048 patent nor the '895 patent describes or suggests a ballistically effective, flexible composite. The objective of the '048 patent is a structural material, i.e., a rigid material (Col. 1-2), not a ballistically effective material. The objective of the '895 patent is a rigid ballistic composite (page 3, lines 5 and 23).

## b) Size of the matrix islands

In contrast to the present invention, the '048 patent provides no definite limitation on the size of the matrix islands. "Minute bridges" are mentioned at Col. 3, line 36, but no guidance is provided as to the meaning of this term. In view of the different objectives of the present invention (ballistic effectiveness) and the '048 patent (a structural material), it is respectfully submitted that the skilled man seeking a ballistically effective, flexible material would not seek direction from the '048 patent except with the impermissible use of hindsight. It is also highly unlikely that routine experimentation for the purpose of providing a structural material would yield the same result for the size of the matrix islands as described in the present invention.

The '895 patent teaches substantially coating the individual filaments (page 4, lines 18-19) and filling the volume not occupied by fibers with the matrix material (page 22, lines 24-28), in contrast to the requirements of the present invention.

## c) Final volume ratio of the matrix

In contrast to the present invention, the '048 patent provides for a "pre-ply" that becomes filled with matrix material in its final state (Col 2, lines 49-54).

The '895 patent has a similar teaching (see above).

It is submitted that the combination of the '048 patent and the '895 patent clearly fails to teach the claimed limitations of the present invention. Applicants respectfully submit, therefore, that a *prima facie* case of obviousness has not been established for amended claims 1 and 27, and claims 2-17, 19-23 and 28 that depend directly or indirectly therefrom.

5. In light of the foregoing amendments and remarks, it is submitted that the claims now of record, i.e., claims 1-17, 19-23, 27-28, are allowable and should be passed to

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issue. Applicants respectfully request the same. The Examiner is invited to call the undersigned attorney if there are any unresolved issues to discuss same.

Respectfully submitted,  
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I hereby certify that this correspondence is being deposited with the United States Patent and Trademark Office via facsimile to Examiner Elizabeth Cole, Group Art Unit 1771, at 703-872-9311 on May 9, 2003.

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